

CLAIMS

1. A liquid crystal display device where a first substrate having a display electrode and a second substrate having an opposite electrode are disposed so as to be opposed to each other via a predetermined clearance, and a liquid crystal display element having a liquid crystal layer is provided in the clearance, wherein
5 an electroluminescent element and an EL control switching element for controlling the electroluminescent element are provided between the first substrate and the second substrate.
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2. The liquid crystal display device according to claim 1, wherein the EL control switching element is formed on a liquid crystal layer side of the first substrate, and the electroluminescent element is formed on a liquid crystal side of the EL control switching element via an
15 insulating film.
3. The liquid crystal display device according to claim 1, wherein the electroluminescent element is formed on a liquid crystal layer side of the first substrate, and an EL control switching element is formed on
20 a liquid crystal layer side of the electroluminescent element via an insulating film.
4. The liquid crystal display device according to claim 3, wherein the electroluminescent element allows light to transmit the first
25 substrate to go out to a side of the first substrate.

5. The liquid crystal display device according to claim 2 or 3,
wherein an EL connecting opening is formed in the insulating film, and
the electroluminescent element and the EL control switching element
5 are electrically connected to each other via the EL connecting opening.

6. The liquid crystal display device according to claim 1, wherein
the electroluminescent element comprises plural kinds of
electroluminescent elements that emit different color lights,
10 respectively.

7. The liquid crystal display device according to claim 6, wherein a
protective film that prevents moisture from permeating the
electroluminescent element is provided on the electroluminescent
15 element.

8. The liquid crystal display device according to claim 7, wherein
an insulating planarizing film for planarizing a step is formed on the
electroluminescent element or the EL control switching element, and a
20 display electrode for the liquid crystal display element is formed on the
planarizing film.

9. The liquid crystal display device according to claim 8, wherein
the planarizing film is provided with a diffusing member that diffuses
25 light.

10. The liquid crystal display device according to claim 8, wherein the display electrode is a reflective electrode and has an opening in its region overlapping with the electroluminescent element.

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11. The liquid crystal display device according to claim 10, wherein a surface of the reflective electrode is formed in an undulated shape.

12. The liquid crystal display device according to claim 11, wherein
10 a surface of the planarizing film is formed in an undulated shape.

13. The liquid crystal display device according to claim 1, further comprising a liquid crystal layer switching element for supplying a signal for display to the liquid crystal layer between the first substrate
15 and the second substrate to be connected to the display electrode.

14. The liquid crystal display device according to claim 13, wherein a display electrode is formed on a liquid crystal layer side of the liquid crystal layer switching element, and the display electrode and the
20 switching element for liquid crystal display layer control are electrically connected to each other via an LC connecting opening formed in the insulating film.

15. The liquid crystal display device according to claim 13, wherein
25 the display electrode is formed on a region that approximately

covers a set of two switching elements comprising the liquid crystal layer switching element and the EL control switching element.

16. The liquid crystal display device according to claim 1, wherein
5 the switching element comprises a thin film transistor having a source electrode, a drain electrode, and a gate electrode.

17. The liquid crystal display device according to claim 16, wherein
the gate electrodes of the EL control switching element and the
10 switching element for liquid crystal display element included in the same display pixel region are connected to each other and the source electrodes thereof are independent from each other.

18. The liquid crystal display device according to claim 16, wherein
15 gate electrodes of the EL control switching elements included in two display pixel regions adjacent to each other, respectively, are connected to each other, gate electrodes of the liquid crystal layer switching elements included in two display pixel regions adjacent to each other, respectively, are connected to each other, and a source
20 electrode of the EL control switching element is connected to a source electrode of the liquid crystal layer switching element included in an adjacent display pixel region.

19. The liquid crystal display device according to claim 16, wherein
25 gate electrodes of the EL control switching elements included in

two display pixel regions adjacent to each other, respectively, are connected to each other, gate electrodes of the liquid crystal layer switching elements included in two display pixel regions adjacent to each other, respectively, are independent from the gate electrodes of the EL control switching elements and are connected to each other, and source electrodes of the EL control switching element and the liquid crystal layer switching element are independent from each other.

20. The liquid crystal display device according to claim 16, wherein the switching element is a thin film transistor having a semiconductor layer made of a poly-silicon thin film.

21. The liquid crystal display device according to claim 20, wherein the EL control switching element is a thin film transistor having a semiconductor layer made of a poly-silicon thin film, and the liquid crystal layer switching element is a thin film transistor having a semiconductor layer made of an amorphous silicon film.

22. The liquid crystal display device according to claim 1, comprising a color filter disposed between the first substrate and the second substrate.

23. The liquid crystal display device according to claim 1, wherein the liquid crystal layer is a mixture of liquid crystal and transparent solid material, and is a scattering type liquid crystal layer that controls

scattering and transmission according to magnitude of a voltage applied to the liquid crystal layer.

24. The liquid crystal display device according to claim 1,
5 comprising an organic insulating film mixed with a member that absorbs moisture and disposed between the first substrate and the display electrode.

25. The liquid crystal display device according to claim 1,
10 comprising at least a polarizing film on a side of the second substrate side opposite to the side on which the liquid crystal layer is provided.

26. The liquid crystal display device according to claim 1,
comprising at least one optical compensator and a polarizing film
15 disposed on a side of the second substrate opposed from the liquid crystal layer in this order from the second substrate side.

27. The liquid crystal display device according to claim 25 or 26,
comprising a light diffusing layer positioned between the
20 electroluminescent element and the polarizing film.

28. The liquid crystal display device according to claim 1,
comprising a light diffusing layer positioned between the
electroluminescent element and the second substrate.

29. The liquid crystal display device according to claim 26, wherein arrangement of an orientation direction of the liquid crystal layer, and the polarizing film and the optical compensator provided on a side of the second substrate opposed from the liquid crystal layer meets

5 arrangement where a transmissivity of the liquid crystal layer becomes approximately maximum during non-application of a voltage to the liquid crystal layer.

30. The liquid crystal display device according to claim 29, wherein
10 a voltage where the transmissivity of the liquid crystal layer becomes approximately maximum is applied to the liquid crystal layer via the liquid crystal layer switching element during light emission from the electroluminescent element.

15 31. The liquid crystal display device according to claim 1, wherein a display face of the liquid crystal display element is positioned on the side of the second substrate, and a light emitting face of the electroluminescent element is positioned on the side of the first substrate.